Immunization and Infectious Disease

During the course of the past decade, a number of new challenges related to infectious disease issues have emerged. At the same time a number of new tools and techniques that promise to enhance efforts to prevent and control infectious diseases have been developed.

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Healthy Maine 2000 Goals

To Reduce the Incidence of Infectious Diseases and Vaccine Preventable Diseases in Maine. To Prevent HIV Infection and Reduce Associated Morbidity and Mortality

Overview

During the 1980s Americans discovered infectious diseases anew. In the previous two decades, many of the most devastating communicable illnesses had seemed to be headed for eradication, while others could be treated readily. The impact of influenza, bacterial pneumonia, and tuberculosis, the leading causes of death at the turn of the century, had been greatly diminished by the mid-1960s. Antibiotic medications, economic advances and especially public health measures, including improvements in hygiene, water and food sanitation, were all important factors in these developments. "Epidemic" had become a term associated with the developing world or with a remote part of American history.

By the mid-1980s, however, a new era had been heralded by the emergence of HIV (Human Immunodeficiency Virus)/AIDS (Acquired Immunodeficiency Syndrome) and the discovery of new infectious maladies including Legionnaire's disease, Lyme disease and toxic shock syndrome. A number of other well-recognized and "controlled" diseases, including measles, rabies and tuberculosis, reemerged as public health threats. The list of common sexually transmitted diseases expanded to include genital *Herpes simplex, Condyloma accuminata* (venereal warts) and *Chlamydia trachomatis*. The safety of the food supply, once taken for granted, was threatened by *Salmonella enteritidis* in eggs and *E. coli 0157:H7* in beef products. It was clear, by late in that decade, that the struggle with pathogenic microbes would be a continuing and dynamic saga.

New and Emerging Issues

During the 1990s, medical and public health professionals witnessed expanded evidence of new and reemerging infectious disease problems. These included: Hepatitis C, multi-drug-resistant bacterial and viral infections, the prospect of a new Influenza pandemic, food-borne Listeriosis, Hantavirus Pulmonary Syndrome, West Nile Virus encephalitis in North America, massive outbreaks of waterborne cryptosporidiosis and threats posed by the use of biological agents as weapons.

In 1993, the Institute of Medicine published a cogent synopsis of the reasons for the emergence of a new era of infectious disease and the outline of a public health strategy to confront the problem. At the center of the strategy was a call for dramatic improvements in capabilities for surveillance of new and unusual diseases, the need to revolutionize laboratory capacity in molecular epidemiology and the importance of multidisciplinary collaborations among the public and private sectors.

Emerging infectious diseases include viral, bacterial and protozoal agents. Many of these diseases pose special threats to vulnerable populations (infants, the elderly, the poor and homeless, recent refugees and immigrants, persons with chronic diseases), while others do not discriminate by place of residence, economic or social class, age and gender, or rural vs. urban residence. Vaccination, public and professional education, early disease recognition and treatment, improved rapid communications and promotion of hygiene all have roles in helping to limit the toll which these diseases exact.

New Challenges

Human Immunodeficiency Virus Infection

Recent improvements in treatment for HIV/AIDS, including new medications given in combination, have resulted in significant changes in the epidemic's profile in Maine. As a result, we have fewer deaths due to HIV and fewer cases of HIV disease progressing to an AIDS diagnosis. This piece of good news, however, is part of a more complex and challenging story of HIV/AIDS in Maine. It has created new demands on those who provide HIV/AIDS prevention and treatment services.

> More people living with HIV also increases the need for complex and costly services.

Fewer deaths, without a corresponding decrease in new infections, means the number of people living with HIV in Maine is steadily increasing. More people living with HIV increases the likelihood that HIV will be transmitted to a greater number of people. More people living with HIV also increases the need for complex and costly services. More people will require more prevention counseling, case management, medical and pharmaceutical services. Coordination of care has become more complex as providers and people living with HIV deal with the high cost of medications, medical care and issues around compliance with complicated drug regimens. These increased needs for services will now extend over the prolonged lifetimes of people living with HIV.

The situation is further complicated by the fact that people living with HIV who are more physically well are also more sexually active. Providing consistent, comprehensive and individualized risk reduction counseling for people living with HIV is now more important than ever. Coordination of care for a common clientele shared by HIV prevention counselors, medical providers, mental health/substance abuse treatment counselors and case managers is essential to help people living with HIV minimize the risk of transmitting HIV to their sex and needle-sharing partners.

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Within this changing picture of HIV/AIDS in Maine and the array of challenges outlined above, there is one additional area of growing concern. This is the transmission of HIV by a person who, knowing they are HIV infected, engages in behaviors that may transmit the virus without disclosing their HIV status to their partners. While our existing criminal laws are adequate, they cannot entirely prevent this type of transmission from occurring without a well-coordinated, focused delivery system of health and human services to people living with HIV.

For example, for the HIV-positive person diagnosed with a mental illness and actively using substances, we need to have in place a service delivery system in which medical treatment, necessary social services and HIV prevention services are closely coordinated and cross-disciplinary in nature. Such an approach needs to be implemented as early as possible when such a client begins receiving services and should be sustained.

Significant changes in the HIV/AIDS epidemic in Maine are occurring. These changes present an increased need for coordinated and focused service design, implementation and evaluation, promoting the highest quality of life for those already infected with HIV and avoiding the further transmission of HIV.

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Immunization

During the 1990s, Maine's childhood vaccination rates increased dramatically, to the highest in the country. Several factors contributed to this success. First, Maine became one of the few states to offer all necessary childhood vaccines for free. This was made possible by pooling together funds from the Centers for Disease Control and Prevention (CDC), Maine Medicaid, and Maine's Health Maintenance Organizations (HMOs) to purchase these vaccines at the federal discount rate, thus saving Maine families and our health care system substantial financial resources.

Second, significant outreach was implemented to Maine's health care providers to give them immunization informational and educational tools, enabling them to increase their vaccine rates. During the last part of the decade, this outreach is being changed from intensive one on one encounters to a web-based system, called ImmPact. Enabling legislation for ImmPact was passed in 1998.

Third, outreach to Maine's families was increased substantially during the 1990s. This outreach has taken the form of direct mailings, media campaigns, informational tools through health care provider offices, and educational outreach to professionals who work with children such as day care providers. As a result, Maine families have more access to information on vaccinations.

New vaccines are being developed and released, many at substantially higher prices than previous vaccines.

However, the Bureau of Health's Immunization Program and its many partners cannot dwell on the successes of the past decade since maintaining this system of support for vaccinations is quickly becoming more difficult and more complex. New vaccines are being developed and released, many at substantially higher prices than previous vaccines. The Bureau of Health's patchwork system of pooling together funds to pay for vaccines is being stretched, and we foresee the day when we may not be able to offer all necessary ones. Licensure is planned for a number of lifesaving products including immunizations for respiratory syncytial virus (RSV), parainfluenza, influenza, pneumococcus, meningococcus, cervical cancer, gastric ulcers, and group A streptococcal infection. In addition, testing continues on a vaccine for HIV, although progress remains slow.

Many of the new vaccines of the past several years and the vaccines for which licensure are pending are primarily for adults, mostly for targeted high-risk adults. For each vaccine there is a different population that is considered high risk. Although we face continued challenges in maintaining our childhood vaccine rates, we face many more difficult challenges in increasing our adult vaccine rates, which are felt to be quite low.

Increased efforts will be necessary to update health providers and the public in order to assure that Maine people can gain the full benefits of these new immunizations. We need to remember that vaccines are one of the most effective disease control methods available and hailed as one of the great health successes of the 20th Century. Vaccinations have allowed us to eliminate childhood deaths from infections with polio, smallpox, diphtheria, tetanus, pertussis, measles, mumps, rubella, and hemophilus influenza b meningitis. Yet, all of these at one time were common causes of death and disability, especially among our children. Still, many areas

of the world have high levels of many of these diseases, making maintaining high vaccination levels important to protect Maine people from epidemics.

Tuberculosis: Towards Elimination!

Tuberculosis (TB), our single biggest cause of death in Maine 100 years ago, killing over 1000 people every year, has virtually been eliminated as a cause of death, due primarily to the number public health interventions. However, Maine continues to see cases of TB, and it continues as a major public health threat worldwide as well as in many large cities in the United States.

Maine's TB cases over the past decade reflect some of the changes experienced nationwide. There have been an increasing number of cases among the foreign born, a number of cases of people co-infected with HIV, and one case with multi-drug resistant TB.

Given the situation worldwide, it is more important than ever that we maintain a strong system assuring adequate testing, treatment, and counseling for patients as well as assuring adequate outreach to health providers. If we are successful, we will be able to reach and maintain the Centers for Disease Control and Prevention goal of TB elimination.

Collaborating Partners

In Maine, during the late 1990s, collaboration among public health professionals, medical providers, government agencies, laboratory researchers, patient advocates, and other professionals has begun to flourish in the approach to some problem areas. Funding from the Centers for Disease Control and Prevention has been used to improve disease surveillance and laboratory capacities. Our efforts have resulted in the achievement of the vast majority of the infectious disease-related Healthy Maine 2000 objectives. However, we face increasing challenges from a growing number of infectious disease threats.

Healthy Maine 2000 Objectives

Immunization and Vaccine-Preventable Disease

Risk Reduction Objective

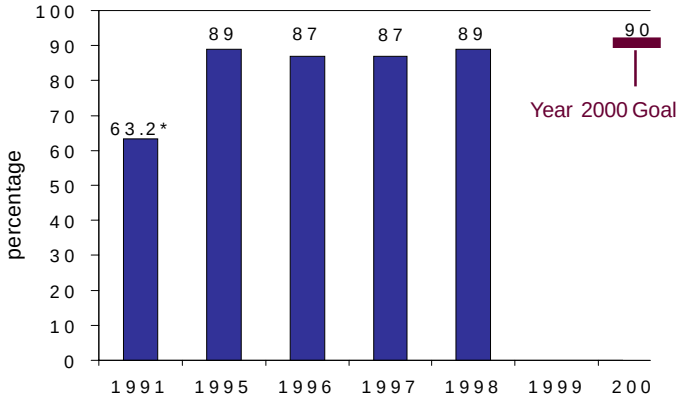
Increase to 90% the percentage of two-year-old children who are age-appropriately immunized.

Maine 1991 Baseline: 63.2% of two-year-old children were age appropriately immunized.

Most Recent Data: 1998, 89% of two-year-old children were age-appropriately immunized.

The benefits of childhood vaccinations has been proven repeatedly over the past fifty years. Most are cost effective from both an economical perspective and in terms of personal suffering that is avoided. For example, studies have shown that over $13 is saved for every dollar invested in measles/mumps/rubella vaccination. The wide spread use of vaccines has resulted in an enormous decrease in incidence of measles, rubella, diphtheria, pertussis, polio and other diseases as well as their potential side effects. Complications resulting from vaccine preventable diseases can range from dehydration, diarrhea, ear infections and pneumonia, to deafness, seizures, mental retardation, and even death.

Percentage of Maine Two-Year-Old Children Age-Appropriately Immunized Selected Years 1991-1998



Source: Maine Department of Human Services, Bureau of Health, Immunization Program, Program Data

***Note:** The 1991 baseline data for this objective was obtained from the results of a 1991 CASA survey and was used primarily for establishing a baseline for this objective. Data reported for years 1995 through 1998 was obtained from the Centers for Disease Control's (CDC) National Immunization Survey. Calendar year data was not available from CDC until 1995.

Health Status Objective

Reduce (or maintain zero incidence) cases of vaccine preventable diseases. Year 2000 Goal: 0 for all

Most vaccine preventable diseases are down 97% from peak levels. Worldwide efforts focused on immunizations have successfully eradicated smallpox and are getting close to achieving the same goal with polio. We have no record of a Maine child dying of a vaccine preventable disease during the 1990s.

Maine's Incidence of Vaccine Preventable Diseases Selected Years 1990-1999

	1990 Baseline	1995	1996	1997	1998	1999
Measles	30	0	0	1	0	0
Diphtheria	0	0	0	0	0	0
Tetanus	1	0	0	0	0	0
Rubella	1	0	0	0	0	0
Congenital Rubella Syndrome	1	0	0	0	0	0
Pertussis	19	50	58	27	34	35
Polio	0	0	0	0	0	0
Mumps	0	4	0	4	0	0
Hemophilus Influenza Type B (Invasive)	22	3	2	3	5	7

Source: Maine Department of Human Services, Bureau of Health, Immunization Program, Program Data

Healthy Maine 2000 Objectives

Immunization and Vaccine-Preventable Disease

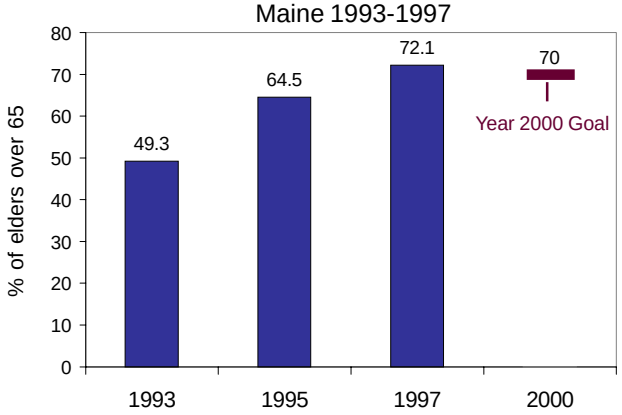
Risk Reduction Objective

Increase to 70% the influenza immunization levels among persons over 65 years of age.

Maine 1993 Baseline: 49.3% of those over 65 years of age had received influenza immunization.
Most Recent Data: 1997, 72.1% of those over 65 years of age had received influenza immunization.

Nationwide an average of 34,000 people die each year during influenza epidemics. More than 90% of these deaths were in people aged 65 and over. As many as 114,000 have flu-related hospitalizations each year.

Maine Immunization Levels
Among Persons Aged 65+
Maine 1993-1997



Source: Maine Department of Human Services, Bureau of Health, Behavior Risk Factor Surveillance System

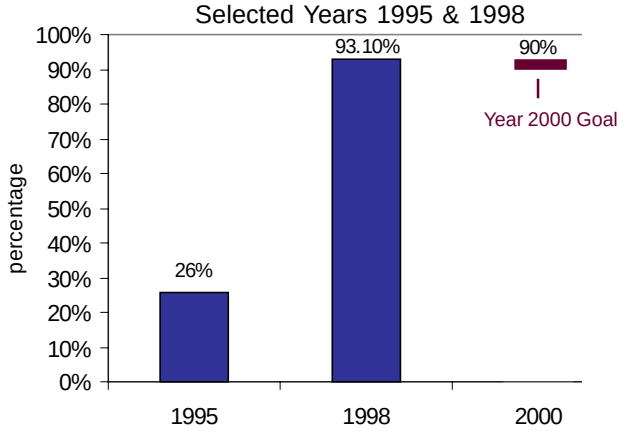
Service and Protection Objective

Increase proportion of children under 1 year of age completing the Hepatitis B immunization series to 90%.

Maine 1995 Baseline: 26% of children under 1 completed the Hepatitis B immunization series.
Most Recent Data: 1998, 93.1% of children aged 13 months received two or more Hepatitis B doses.

Hepatitis B (HBV) is a viral infection that can result in severe liver diseases and cancer. Children who become chronically infected have a 25% risk of dying prematurely. Prior to the implementation of routine vaccination, 45,000 children nationally under 10 years of age were infected with HBV annually. It is estimated that one-third of the 1.25 million Americans with chronic HBV infection acquired their infection as infants or young children. Hepatitis B vaccine is now available and routinely administered to children starting at birth.

Proportion of Maine Children Under 1yr.
Receiving Hepatitis B Series Immunization
Selected Years 1995 & 1998



Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control, Program Data

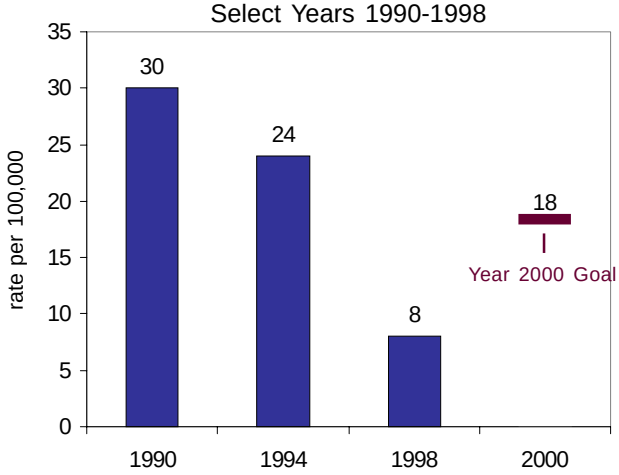
Health Status Objective

Reduce the incidence of acute hepatitis B infection to no more than 18 cases per 100,000 population.

Maine 1990 Baseline: estimated 30 cases per 100,000.
Most Recent Data: 1998, estimated 8 cases per 100,000.

HBV is contracted through unsafe sexual practices, through blood contact, through use of shared needles, and from an infected mother to her unborn child. Public health measures addressing these modes of transmission have been successful in reducing rates of HBV in Maine.

Maine Incidence of Acute Hepatitis B
Infection Rate Per 100,000 Population
Select Years 1990-1998



Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control, Program Data

Healthy Maine 2000 Objectives

Immunization and Vaccine-Preventable Disease

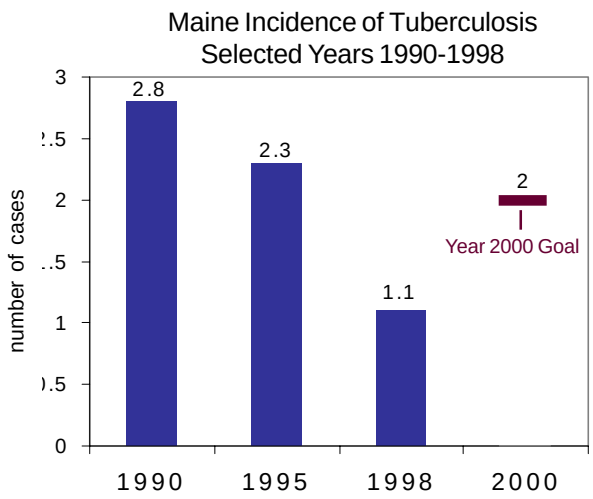
Health Status Objective

Reduce tuberculosis to an incidence of no more than 2.0 cases per 100,000 population.

Maine 1990 Baseline: 2.8 cases per 100,000.
Most Recent Data: 1998, 1.1 cases per 100,000.

The nearer Maine gets to eliminating tuberculosis, the more difficult it becomes to maintain physician awareness of the disease and to maintain the program infrastructure. Low incidence of disease leads to misdiagnosis, and when TB is diagnosed, there may not be appropriate treatment initiation and management. This can lead to drug resistant TB which is very difficult and expensive to treat.

The infrastructure provided by the Bureau of Health must be maintained to provide timely disease surveillance, case management and coordination of contact investigations to prevent a TB outbreak and to facilitate health professional education to assure prompt diagnosis and treatment.



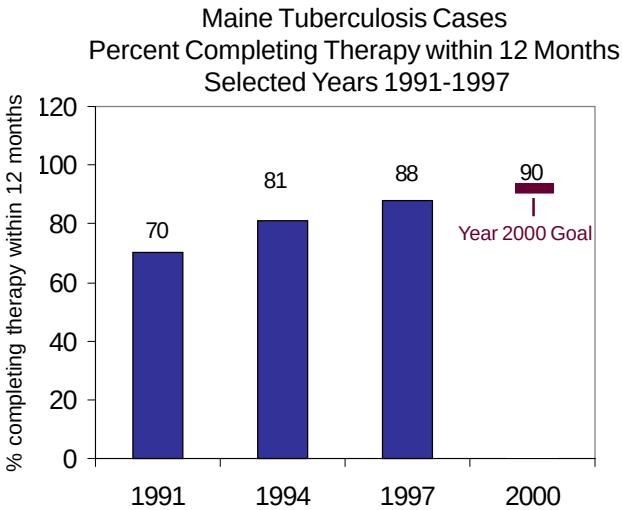
Source: Maine Department of Human Services, Bureau of Health, Tuberculosis Program

Surveillance Objective

Increase to 90 percent the proportion of tuberculosis cases who complete therapy within 12 months.

Maine 1991 Baseline: 70%.
Most Recent Data: 1997, 88%.

Completion of treatment in a timely manner is essential to attaining the goal of TB elimination. If treatment is not continued for a sufficient length of time, the patient may become ill and infectious again, thus able to further spread disease. Incomplete treatment can also lead to drug resistance.



Source, Maine Department of Human Services, Bureau of Health, Tuberculosis Program

Healthy Maine 2000 Objectives

HIV Infection and Associated Morbidity and Mortality

Health Status Objective

Limit the crude incidence rate of AIDS cases to no more than 8.0 per 100,000.

Maine 1990 Baseline: 5.0 cases per 100,000
Most Recent Data: 1998, 3.4 cases per 100,000

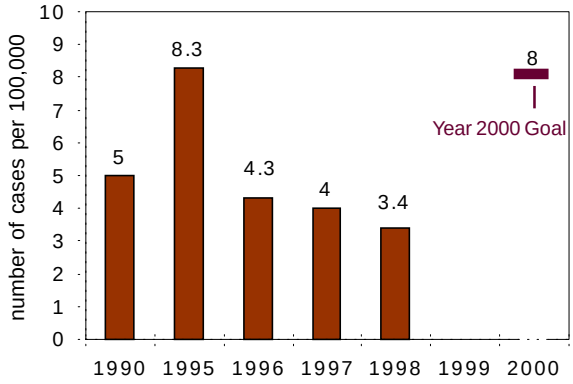
Maine's first documented case of AIDS was reported in 1984, and the number of AIDS cases in Maine has been relatively low compared to more populous states with large urban centers. In 1998, for example, Maine's AIDS incident rate was 3.4 per 100,000 population compared to 47.7 in New York. Despite Maine's comparatively low AIDS incidence, the impact on those who have been infected and affected by the epidemic cannot be underesti-mated. Individuals, families and entire communities have coped with tragedy and challenge, exercising compassion and heroism, to dramatically affect our attitudes and institutions.

The Maine Bureau of Health collects data on both HIV infection and AIDS. A diagnosis of AIDS represents the occurrence of life threatening or disabling disease manifestations in a person with HIV infection, and usually occurs at least several years after HIV infection. In recent years, new medical treatments for HIV have altered the course of the epidemic by significantly reducing the number of HIV-infected individuals who progress to AIDS, as well as reducing the number of AIDS-related deaths. For this reason, epidemiologic surveillance has shifted to emphasize HIV incidence as well as AIDS.

During 1998, 33 cases of AIDS among Maine residents were reported to the Bureau of Health, a 19% decrease over 1997 totals. In addition, 16 AIDS-related deaths occurred in 1998, representing a 24% decrease over the previous year. These downward trends mirror a national decrease in AIDS incidence and deaths, and likely reflect the efficacy of new treatments for HIV. Of the cases reported in 1998, 36% were residents of the southern region of the state, 27% were residents of the central region and 36% were residents of the northern region. This represents an increase in the number of cases reported in the northern region. More than half the 1998 cases, 54%, were among residents of non-metropolitan areas in Maine.

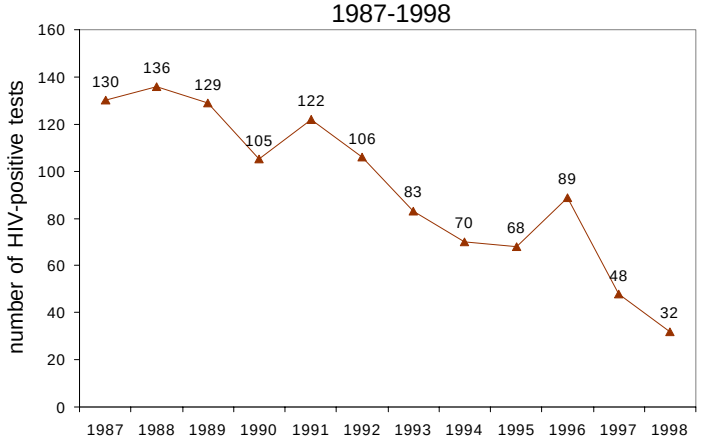
Although the number of new AIDS cases and AIDS-related deaths has decreased, new HIV diagnoses continue to occur in Maine, indicating a slow but steady increase in HIV prevalence. During 1998, there were 32 reports of new HIV-positive tests in the state. It is estimated that between 950 and 1,300 people are currently HIV-infected in Maine.

Maine AIDS Cases
Crude Incidence Rate 1990-1998



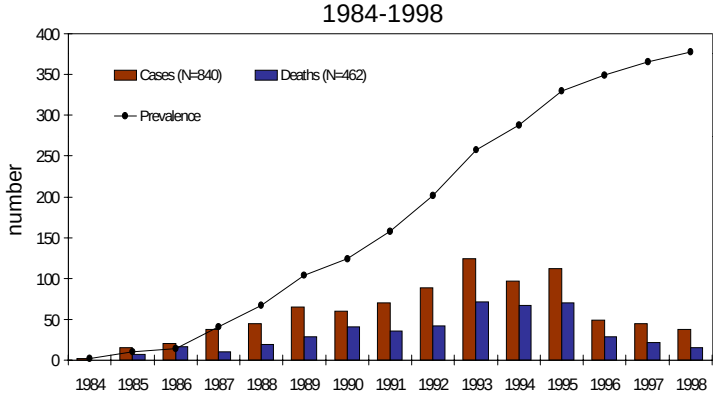
Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control

HIV-Positive Tests Reported to the Maine Bureau of Health, 1987-1998



Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control

Maine AIDS Cases, Deaths and AIDS Prevalence 1984-1998



Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control

Healthy Maine 2000 Objectives

HIV Infection and Associated Factors

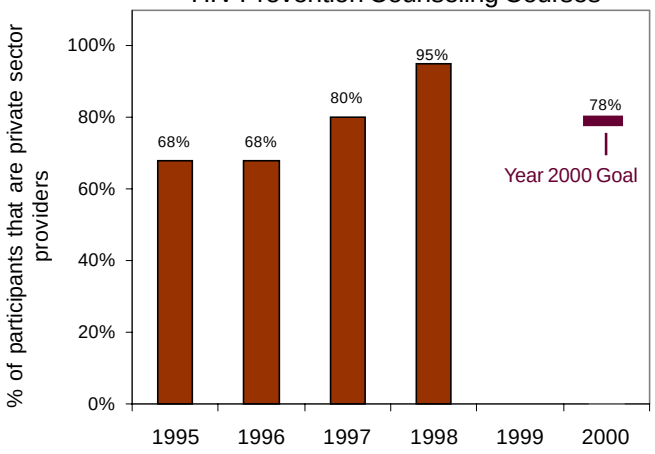
Service and Protection Objective

Increase the number of private sector providers taking HIV prevention counseling courses by 10%

Maine's 1995 Baseline: Indicates that private-sector providers represented 68% of all participants taking HIV Prevention Counseling courses.
Most Recent Data: By 1998, 95% of the participants in courses were private-sector providers.

HIV Test Counseling courses have been designed to assist clinicians who counsel patients about HIV testing. Topics include: AIDS Epidemiology, Maine law as it relates to HIV testing, occupational exposure, post-exposure prophalaxis and basic counseling skills.
When more providers develop the capacity to offer HIV testing services through these training opportunities, rates of HIV testing in the private sector improve, as does the quality of the services. Greater access to quality HIV testing services is an important part of our overall goal to increase number of at-risk persons who learn their HIV-status.

Maine's Private-Sector Providers
As a Percent of Participants in
HIV Prevention Counseling Courses



Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control, Program Data

Service and Protection Objective

Maintain availability of partner notification services for 100% of requests

Partner Counseling and Referral Services (PCRS) are available throughout the state through the Bureau of Health. Work is divided into four service areas: Southern Maine (York, Cumberland, Sagadahoc Counties), Central and Western Maine (Androscoggin, Franklin, Oxford Counties), Central and Mid-Coast Maine (Kennebec, Knox, Lincoln, Somerset Counties), Northern and Downeast Maine (Aroostook, Hancock, Penobscot, Piscataquis, Washington, Waldo Counties).

PCRS has two goals. 1) To ensure that services are provided to persons infected with HIV or STDs and their sex or needle-sharing partners so they may avoid infection or, if already infected, can prevent transmission to others. 2) To help partners gain earlier access to individualized counseling, HIV and STD testing, medical evaluation, treatment and other prevention services.

Maine Performance of
Partner Notification Services
1994-1998

Reporting Year	Number of Requests for Partner Notification Services	Number Receiving Partner Notification Services	Percent of Total Receiving Requested Services
1994	37	37	100%
1995	26	26	100%
1996	52	52	100%
1997	22	22	100%
1998	19	19	100%

Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control, Program Data

Healthy Maine 2000 Objectives

Sexually Transmitted Diseases

Health Status Objective

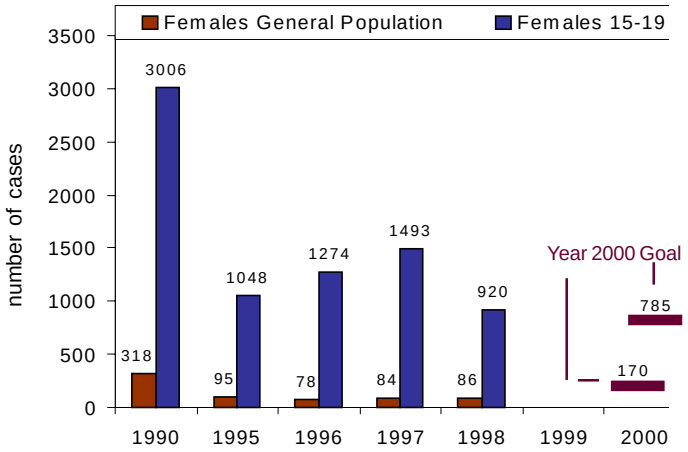
Reduce chlamydia incidence to no more than 170 cases per 100,000 in the general population and to no more than 785 cases per 100,000 in females age 15-19.

Maine 1990 Baseline:
318 cases per 100,000 in the general female population;
3,006 cases per 100,000 in females age 15-19.

Most Recent Data, 1998:
86 cases per 100,000 in the general female population;
920 cases per 100,000 in females age 15-19.

With 1,073 cases reported during 1998, chlamydia rates remain largely unchanged when compared with recent years. As in the past, females, and young females in particular, continue to be disproportionately affected. 84% of all chlamydia cases reported to the Maine Bureau of Health occurred among females, with 37% occurring among females aged 15-19 years.

Maine Incidence of Chlamydia
General Population
Selected Years 1990-1998



Source: Maine Department of Human Services, Bureau of Health, Division of Disease Control, Program Data

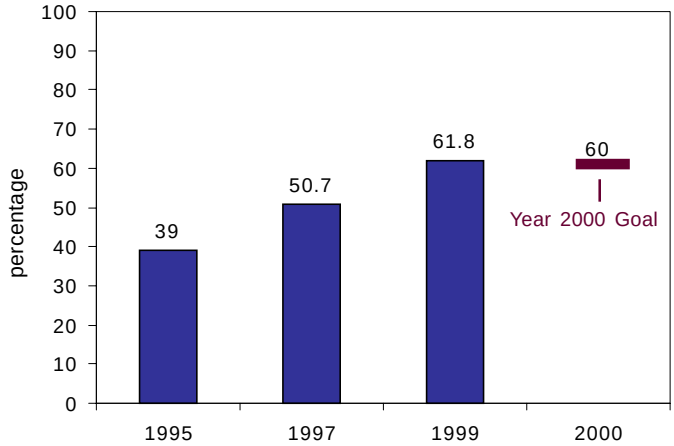
Risk Reduction Objective

Increase the rate of consistent condom use among sexually active adolescents to 60%.

Maine 1995 Baseline: 39% according to the Youth Risk Behavior Survey.
Most Recent Data: 1999, 61.8% according to the Youth Risk Behavior Survey.

Use of condoms among sexually active teens is a proven method to reduce transmission of sexually transmitted diseases. Bureau funded prevention programs include skill-building activities to increase effective condom use.

Rate of Condom Use Among
Sexually Active Teenagers in Maine
1995-1999



Source: Maine Youth Risk Behavior Survey: 1995, 1997, and 1999.

Note: 1999 data is unweighted.